

Patent Claims

1. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30° ,
- the signal generator device is implemented as a rotational-angle sensor (1) that includes at least an ASIC (20, 21) with a Hall-effect (20H, 21H),

- the ASIC (20, 21) with the Hall-effect (20H, 21H) and a buffer unit (60, 61) are connected with a microprocessor unit (50, 51),
- an input-switching device (65, 66) is pre-connected to the ASIC (20, 21) with the Hall-effect (20H, 21H) and a buffer unit (60, 61), and
- the microprocessor unit (50, 51) is connected to an output switching device (52, 53, 58; 54, 55, 59) whose output produces a pulse-width-modulated signal(PW1, PW2) with selectable frequencies (F1, F2, F3, F4).

2. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30° ,
- the signal generator device is implemented as a rotational-angle sensor (1) that includes at least an ASIC (22, 24) with a Hall-effect (22H, 24H),
- the ASIC (22, 24) with the Hall-effect (22H, 24H) are connected with a microprocessor unit (70, 80),
- the microprocessor unit (70, 81) has an Analog/Digital converter (72, 82) connected after it whose output (56, 57) produces an analog signal (AN1, AN2).

3. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
 - a base plate element (3),
- that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal (2) movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30°,

- the signal generator device is implemented as a rotational-angle sensor (1) that includes at least an ASIC (23) with a Hall-effect (23H),

- that an input-switching unit (76) is placed before the ASIC (23) with the Hall-effect (23H),

- the ASIC (23) with the Hall-effect (23H) are connected with a microprocessor unit (71),

- the microprocessor unit (71) has an output switching device (73) connected after it whose output (73') produces a switching signal (GT).

4. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30° ,
- the signal generator device is implemented as a rotational-angle sensor (1) that includes at least an ASIC (25) with a Hall-effect (25H),
- the ASIC (25) with the Hall-effect (25H) are connected with a microprocessor unit (81),

- that an input-switching unit (83) is placed before the ASIC (25) with the Hall-effect (25H), and

- a first output (86) of the microprocessor unit (81) to which a first output stage (84) is assigned, and a second output (87) to which a second output stage (85) is assigned, produce push-pull signals (GE1, GE2).

5. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal (2) movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position

and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30°,

- the signal generator device is implemented as a rotational-angle sensor (1) that includes at least an ASIC (20) with a Hall-effect (20H) and a second ASIC (21) with a second Hall-effect (21H),
- the first ASIC (20) with the Hall-effect (20H) and a first buffer unit (60) are connected with a microprocessor unit (50),
- the second ASIC (21) with the second Hall-effect (21H) and the second buffer unit (61) are connected with a second microprocessor unit (51),
- that a first input-switching unit (65) is placed before the ASIC (20) with the Hall-effect (20H) and a first buffer unit (60),
- that a second input-switching unit (66) is placed before the ASIC (21) with the Hall-effect (21H) and a second buffer unit (60, 61),
- the first microprocessor unit (50) has a first output switching device (52, 53, 58) connected after it whose output (56) produces a first pulse-width-modulated signal (PW1) with selectable frequencies (F1, F2, F3, F4), and

- the second microprocessor unit (51) has a second output switching device (54, 55, 59) connected after it whose output (57) produces a second pulse-width-modulated signal (PW2) with selectable frequencies (F1, F2, F3, F4).

6. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30°,

- the signal generator device is implemented as a rotational-angle sensor (1) that includes a third ASIC (22) with a Hall-effect (22H) and a fourth ASIC (23) with a fourth Hall-effect (23H),
- the third ASIC (22) with the third Hall-effect (22H) is connected with a third microprocessor unit (70),
- the fourth ASIC (23) with the fourth Hall-effect (23H) is connected with a third microprocessor unit (76),
- the fourth ASIC (23) with the fourth Hall-effect (23H) is connected with a fourth microprocessor unit (71),
- that a first Analog/Digital converter (72) is connected after the third microprocessor unit (70) whose output (72') produces a first analog signal (AN1), and
- an output switching unit (73) is connected after the third microprocessor unit (71) whose output (73') produces a switching signal (GT).

7. Floor pedal device for heavy motor vehicles, more particularly trucks, buses, mobile cranes, and the like that includes at least

- a pedal element (2) and

- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, and

- a signal generator device that is at least partially connected with the connector device and that creates a signal corresponding to pedal (2) movement,

characterized in that

- the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 5 to 30°,

- the signal generator device is implemented as a rotational-angle sensor (1) that includes a fifth ASIC (24) with a fifth Hall-effect (24H) and a sixth ASIC (25) with a sixth Hall-effect (25H),

- the fifth ASIC (24) with the fifth Hall-effect (24H) is connected with a fifth microprocessor unit (80),

- the sixth ASIC (25) with the fourth Hall-effect (25H) is connected after a fourth input-switching unit (83),

- the fifth ASIC (25) with the fifth Hall-effect (25H) is connected with a fifth microprocessor unit (80),
- that a second Analog/Digital converter (82) is connected after the fifth microprocessor unit (80) whose output (82') produces a second analog signal (AN2), and
- a first output (86) of the sixth microprocessor unit (81) to whom a first output stage (84) is assigned, and a second output (87) to which a second output stage (85) is assigned, produce push-pull signals (GE1, GE2).

8. Device as in Claim 1 or 2 or 3 or 4 or 5 or 6 or 7, characterized in that the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal-combustion engine through a pedal angle (α) of between 0° and 22°.

9. Device as in Claim 1 or 8, or 2 or 8, or 3 or 8, or 4 or 8, or 5 or 8, or 6 or 8, or 7 or 8, characterized in that the connector device includes a separate return spring (16) to return the rotational-angle sensor to the idle position in addition to the return spring (5, 12) to return the pedal element (2) to the idle position.

10. Device as in Claim 9, characterized in that two return-spring elements (5, 12) are provided.

11. Device as in at least one of the prior Claims 1 through 10, characterized in that the selectable frequencies (F1, F2, F3, F4) of each pulse-width signal (PW1, PW2) with each buffer unit (60, 61) may be adjusted.

12. Device as in at least one of the prior Claims 1 through 11, characterized in that each ASIC (20, 21, 22, 23, 24, 15, 26) includes an ASIC microprocessor unit with a buffer circuit programmable via flat plugs (38) of the encapsulated rotational-angle sensor (1).

13. Device as in at least one of the prior Claims 1 through 12, characterized in that the first through sixth microprocessor units (50, 51, 70, 71, 80, 81) and its pertinent buffer unit (60, 61) is programmable via flat plugs (38) of the encapsulated rotational-angle sensor (1).

14. Device as in at least one of the prior Claims 1 through 13, characterized in that the buffer circuits of each ASIC (20, 21, 22, 23, 24, 15, 26), the buffer unit, the first buffer unit (60), and the second buffer unit (61) are implemented as an E²PROM.

15. Device as in at least one of the prior Claims 1 through 14, characterized in that the pedal element in the idle position (2) subtends a floor angle β with respect to the base plate element (3).

16. Device as in at least one of the prior Claims 1 through 15, characterized in that the floor angle (β) minus the pedal angle (α) equals the final-position angle (γ).

17. Device as in Claim 16, characterized in that the floor angle (β) is 30°, 35°, or 40°, and the final-position angle (γ) is 13° or 23°.

18. Use of a rotational-angle sensor (1) that includes at least an ASIC (20, 21) with a Hall-effect (20H, 21H) that produces an ASIC output voltage (U_{AS}) with a linear section (U_L) for a floor pedal device for heavy vehicles, particularly trucks, buses, mobile cranes, etc. that includes at least:

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, whereby the pedal element (2) in the connector device (5, 7, 8, 9, 10,

11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal combustion engine to create signals corresponding to the pedal movement of such a type that

- a pedal angle (α) between the idle position and the full-throttle position is between 0° and 5° through 30° and
- the pedal angle (α) of between 0° and 5° through 30° is determined by means of a linear section (U_L) of the ASIC output voltage as the pedal element (2) is moved, and is converted into a pulse-width-modulated signal (PW1, PW2) with selectable frequencies (F1, F2, F3, F4).

19. Use of a rotational-angle sensor (1) that includes at least an ASIC (22, 23) with a Hall-effect (22H, 23H) that produces an ASIC output voltage (U_{AS}) with a linear section (U_L) for a floor pedal device for heavy vehicles, particularly trucks, buses, mobile cranes, etc. that includes at least:

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, whereby the pedal element (2) in the connector device (5, 7, 8, 9, 10,

11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal combustion engine to create signals corresponding to the pedal movement of such a type that

- a pedal angle (α) between the idle position and the full-throttle position is between 0° and 5° through 30° and
- the pedal angle (α) of between 0° and 5° through 30° is determined by means of a linear section (U_L) of the ASIC output voltage as the pedal element (2) is moved, and is converted into an analog signal (AN1, AN2) by means of additional components (44).

20. Use of a rotational-angle sensor (1) that includes at least an ASIC (22, 23) with a Hall-effect (22H, 23H) that produces an ASIC output voltage (U_{AS}) with a linear section (U_L) for a floor pedal device for heavy vehicles, particularly trucks, buses, mobile cranes, etc. that includes at least:

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, whereby the pedal element (2) in the connector device (5, 7, 8, 9, 10,

11, 12, 13, 15, 16) may be moved between the idle position and the full-throttle position of an internal combustion engine to create signals corresponding to the pedal movement of such a type that

- a pedal angle (α) between the idle position and the full-throttle position is between 0° and 5° through 30° and
- the pedal angle (α) of between 0° and 5° through 30° is determined by means of a linear section (U_L) of the ASIC output voltage as the pedal element (2) is moved, and is converted into a switching signal (GT) by means of additional components (44).

21. Use of a rotational-angle sensor (1) that includes at least an ASIC (22, 23) with a Hall-effect (22H, 23H) that produces an ASIC output voltage (U_{AS}) with a linear section (U_L) for a floor pedal device for heavy vehicles, particularly trucks, buses, mobile cranes, etc. that includes at least:

- a pedal element (2) and
- a base plate element (3),

that are connected to each other through a connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) so that they may move, whereby the pedal element (2) in the connector device (5, 7, 8, 9, 10, 11, 12, 13, 15, 16) may be moved between the idle position and

the full-throttle position of an internal combustion engine to create signals corresponding to the pedal movement of such a type that

- a pedal angle (α) between the idle position and the full-throttle position is between 0° and 5° through 30° and
- the pedal angle (α) of between 0° and 5° through 30° is determined by means of a linear section (U_L) of the ASIC output voltage as the pedal element (2) is moved, and is converted into push-pull signals (GE1, GE2) by means of additional components (44).

22. Application as in Claim 18 or 19 or 20 or 21, characterized in that the additional components (44) are enclosed within a housing unit (36, 37) of the rotational-angle sensor (1) along with the ASIC circuits (20, ..., 26) with Hall-effect devices (20H, ... 26H).

23. Application as in one of prior Claims 18 through 22, characterized in that the pedal element (2) is moved through a pedal angle (α) of between 0° and 22° .